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AUTHOR Chan, Kara K. W.
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ABSTRACT

A postal survey on a random cluster sample of 1,032 secondary school students in Hong Kong was conducted to investigate how much students know about the environment and how their environmental cognition is shaped by the use of mass media. Results indicated that students were very knowledgeable on both general and local environmental issues. The average score for environmental knowledge was 60.7 on a 100-point scale. Results indicated that students' environmental cognition was shaped and framed by the reporting of environmental news in Hong Kong. Television news viewership had positive correlation with students' environmental knowledge while Chinese newspaper readership had a positive but weak correlation. Male students and students in higher forms were more knowledgeable about the environment. The study established a comprehensive measure for both general and local environmental knowledge with an acceptable level of internal consistency for subsequent studies. (Contains 5 tables of data and 19 references.) (Author/CR)

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Dr. Chan, Kara K.W.
Assistant Professor, Department of Communication Studies
Hong Kong Baptist University
Kowloon Tong, Hong Kong

Tel: (852) 2339 7836 Fax: (852) 2339 7890
email: karachan@hkbu.edu.hk

Dr. Chan, Kara K.W. is an Assistant Professor at the Department of Communication Studies, Hong Kong Baptist University. She served in the advertising and public relations profession and as a statistician for the Hong Kong Government. She actively involves in research on Hong Kong and China's mass communication, advertising and consumer behavior, and environmental studies.

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Mass media and environmental cognition in Hong Kong

Abstract

A postal survey on a random cluster sample of 1,032 secondary school students in Hong Kong was conducted to investigate how much students know about the environment and how their environmental cognition is shaped by the use of mass media. Results indicated that students were very knowledgeable on both general and local environmental issues. The average score for environmental knowledge was 60.7 on a 100-point scale. Results indicated that students' environmental cognition was shaped and framed by the reporting of environmental news in Hong Kong. Television news viewership had positive correlation with students' environmental knowledge while Chinese newspaper readership had a positive but weak correlation. Male students and students in higher forms were more knowledgeable about the environment. The study established a comprehensive measure for both general and local environmental knowledge with an acceptable level of internal consistency for subsequent studies.

Mass media and environmental cognition in Hong Kong

1. Introduction

Hong Kong, like many other well-developed cities in the world, suffers from many environmental problems. Industrial, commercial, and in-home activities produce a wide variety of wastes of varying quantities. These activities lead to different environmental problems such as water pollution, disposal of solid and chemical wastes, undesirable levels of air pollutants, and noise. In a survey on indicators of social development of Hong Kong conducted in 1988, it was found that 'environmental protection' was cited as the fifth most serious social problem that should be solved immediately (Lau and Wan, 1991).

As the world population continues to expand, the role of conservation is becoming critical. Conservationists have concentrated their efforts on technological or biological solutions to environmental problems. Despite the advances in technology, there is a growing recognition that technology alone cannot solve environmental problems. Maloney and Ward (1973) described the ecological crisis not as a technical problem but as a crisis of mal-adaptive behavior; the root of environmental problems is human behavior.

The problem of environmental pollution might be better solved or reduced by a tighter control through legislation on commercial and industrial activities that produce pollutants as well as through education and mass communication campaigns. More environmentally responsible behaviors on the part of the general public should be encouraged.

The Hong Kong Government has played an important role in enhancing the environmental awareness of the Hong Kong community concerning environmental problems. The government's White Paper was published on World Environment Day, June 5, 1989 (Hong Kong Government, 1989). It discussed the existing status of the environment and detailed an ambitious plan to combat pollution.

The Government's overall objectives for environmental education are:

- to make our community aware of its responsibilities in creating and maintaining a healthy and pleasant environment;
- to encourage the development of a well informed, environmentally aware and responsible community;
- to make decision makers more aware of the implications of their decisions on the environment and the health and welfare of the community (Hong Kong Government, 1989).

The Environmental Campaign Committee was established by the Government in 1990 to organize environmental events and mass communication campaigns aimed at the promotion of public awareness of environmental issues. Coupled with Government's effort in promoting environmental awareness, environment issues have also become political, economic, and social issues. Wide media coverage of issues such as global warming, depletion of the ozone layer, and specific events such as the Chernobyl nuclear plant incident, as well as the Hong Kong government's waste control policy have focused attention on environmental issues.

In a recent survey of community attitudes on the environment, over 98% of Hong Kong residents agreed that 'individuals have a responsibility to protect the environment' (Environmental Campaign Committee, 1993). However, when they were asked whether they had actually practiced environmental protection behaviors, such as refusal to use plastic bags or separating waste paper for recycling, the percentage of positive responses dropped to only 30 to 60% (Environmental Campaign Committee, 1993). The findings indicated that there was a significant discrepancy between people's attitudes and their actual behaviors.

Ramsey and Rickson (1976) argued that increased knowledge about the environment would establish pro-environmental attitudes, and both knowledge and attitudes were important for changing human actions. While many research efforts have been directed toward environmental issues, limited effort has gone into investigating what and how much the public knows about the environment (Arcury, 1990). The research literature indicates that knowledge

about the environment very often related with the use of mass media. In Chan's (1996) study on environmental attitudes of secondary school students in Hong Kong, the major sources of environmental information were television, school and newspapers. What are the effects of use of mass media on students' environmental knowledge? This study is an attempt to begin to enlarge our understanding of the relationship between the use of mass media and environmental knowledge.

2. Literature review

Environmental knowledge has been a interdisciplinary subject drawing relevant knowledge from the natural and social sciences as well as humanities. It sometimes also deals with moral decisions about values and powers (Hausbeck, Milbrath and Enright, 1992).

Maloney and Ward (1973) compared members of a conservation group, a group of college students, and a non-randomly selected group of adults with no college experience, all from California. They found that environmental knowledge was associated with conservation group membership and education. Ramsey and Rickson (1976) surveyed high schools students and found that increased environmental knowledge moderates environmental concern. Arbuthnot (1977) compared a sample of 85 users of a recycling centre with 60 members of conservative churches. He found that increased environmental knowledge was associated with relatively liberal attitudes in political, social and religious issues as well as perceived empowerment concerning environmental issues.

Arcury and his colleagues (Arcury, Johnson and Scollay, 1986; Arcury and Johnson, 1987; Arcury, Scollay and Johnson, 1987) analyzed the results of several national surveys conducted in the United States that included measures of environmental knowledge.

Arcury, Scollay and Johnson (1987) found that males were more knowledgeable and concerned about acid rain. Age, educational attainment, and exposure to television news were found to be associated with knowledge about acid rain. Arcury, Johnson and Scollay (1986) examined the relationship between environmental worldview, measured with the New

Environmental Paradigm scale (Dunlap and Van Liere, 1978), and general environmental knowledge. Worldview, income, education, and gender (male) were each found to have independent positive influences on knowledge. Arcury and Johnson (1987) compared the results of the state surveys in 1985 and 1980 and concluded that the level of public environmental knowledge in both periods was low, and that the major correlates of environmental knowledge were education, income, and gender (male).

Arcury and Christianson (1993) examined differences in global environmental knowledge, concern, and actions between rural and urban residents using telephone survey data from a sample of 624 Kentucky River Drainage Basin residents. Although they expected that the more urban and metropolitan an individual, the greater would be her/his environmental characteristics, they found no consistent differences by residence. They attributed the lack of difference in environmental knowledge by residence to the common source of mass media used for obtaining global environmental information.

Brothers, Fortner and Mayer (1991) studied the impact of a television news program in educating people about the Great Lakes environment. In May 1989, a Cleveland TV station broadcast selected knowledge questions and their answers with accompanying explanatory video segments on the evening news program. Following the broadcast, 461 Clevelanders completed a questionnaire at county and city library branches. Comparison of respondents' knowledge scores on questions that had and had not been broadcast demonstrated that the news program greatly increased knowledge levels. Television was the primary source of Great Lakes information for most respondents, followed by newspapers. However, respondents who cited newspapers or lake activities as their primary information source scored significantly higher on the knowledge items than those who cited television as primary information source.

Hausbeck, Milbrath and Enright (1992) surveyed approximately 3,200 students from a sample of 30 secondary schools in New York and found that students scored rather low on environmental knowledge but scored very high on environmental awareness and concern. Environmental knowledge was found positively correlated with age, family income, gender

(male), and exposure to mass media and personal sources outside school. Electronic and print media were most frequently cited by students as their sources of environmental knowledge. School was cited as the third important source.

Based on telephone survey of 336 Ithaca, New York residents, Ostman and Parker (1986) found that newspapers and television were the most frequently used media for environmental information. Educated respondents used television less for environmental news and they preferred print media as believable sources of environmental information. Less educated respondents relied more heavily on television than on newspapers for environmental information.

Ostman and Parker (1987) analyzed the same database and found that newspaper use for environmental content was correlated with attention to environmental content in mass media, environmental awareness and concerns, and pro-environmental behaviors, but not with environmental knowledge. Television use for environmental content was not related to attention, awareness, concern, knowledge, and pro-environmental behaviors.

To conclude, environmental knowledge was found to influence environmental attitudes and environmental behaviors. Education attainment, gender (male), and exposure to environmental messages in the media correlated with possession of environmental knowledge. Environmental knowledge was also found to be highly issue and geographic specific.

Despite of the importance of environmental knowledge in environmental studies, there is a lack of consistency in measurement. Some measured the environmental knowledge on global issues including the greenhouse effect and acid deposition while others measured environmental knowledge on local issues, such as sources of energy and water supply. There is a great variety in method of inquiry, types of questions included, and scope of environmental issues. Some reported reliability but very few reported on validity measures.

In most of these studies, environmental knowledge was measured by asking respondents to responding to multiple-choice questions with correct and incorrect answers. Other types of

measurement of environmental knowledge employed include the use of a self-reported assessment by asking respondents to estimate their level of knowledge on specific topics from knowing nothing to knowing a lot (e.g. Arcury, Johnson and Scollay, 1986). This kind of measure is criticized for its lack of objectivity (Arcury, 1990).

In some studies (e.g. Arbuthnot, 1977; Arcury and Christianson, 1993), respondents' environmental knowledge was assessed based on responses to open-ended questions on selected global or local environmental issues. Later, their answers were coded as incorrect and don't know, partially correct or correct. This type of measurement may suffer from bias from coders.

The author, therefore, recommends establishment of an environmental knowledge scale using a multiple choice format. It is proposed to consist of two sub-scales: one on general environmental knowledge and one on local environmental knowledge. General environmental knowledge refers to the factual information that individuals have about the environment, the ecology of the planet, and the influence of human actions on the environment. Local environmental knowledge refers to the factual information that individuals have about the environment and ecology of Hong Kong, causes and effects of environmental pollution problems faced in Hong Kong and possibilities for environmental protection.

3. Research objectives

The current study attempts to investigate Hong Kong students' environmental knowledge and the relationship to their use of mass media.

The objectives of the study are:

1. to investigate what and how much Hong Kong students know about general and local ecological and environmental issues;

2. to establish measures on *general*, *local*, and *total* environmental knowledge and to assess the internal consistency to the Hong Kong context;

3. to investigate the correlation between environmental knowledge and students' use of mass media; and

4. to compare the environmental knowledge for respondents of different demographics.

4. Research method

A list of 447 secondary schools in Hong Kong, arranged in district areas, was obtained. A systematic random sample of 40 schools was selected so that the sample was evenly distributed among areas. A letter together with 40 copies of the questionnaire and pre-paid return envelop were mailed to the principals of the selected schools on April 11, 1995. Survey documents were distributed to any one class of forms 3, 4 or 6 (i.e. grades 9, 10 or 12) students in the ratio 2:2:1 to reflect a similar distribution of students among different forms.

The study was conducted using a structured close-ended type questionnaire in Chinese. Two questionnaires (A and B) were developed. They consisted of two parts focusing on environmental knowledge and use of mass media. The first part contained 40 questions on a variety of environmental issues including world population, energy, wildlife threats, global warming and ozone depletion, rain forests, acid rain, air pollution, waste management, noise pollution, environmental awareness, and protection. Specific items of these issues were selected by the author from a variety of sources. These included annual reports of the Environmental Protection Department, teaching kits on environmental protection, a literature review of past major environmental disasters, promotional materials on environmental awareness campaigns, and books. The questions were then reviewed by a colleague at the University who was knowledgeable about ecological and environmental issues.

Each questionnaire contained 20 questions on general environmental knowledge and 20 questions on local environmental knowledge in the form of multiple choice. Four choices were given for each question and only one answer was correct. For each correct answer, 2.5 marks were awarded and no marks would be awarded nor deducted for wrong answers. The maximum possible score for the total environmental knowledge was, therefore, 100. It was

also possible to sum the total scores separately for the 20 general environmental knowledge questions and the 20 local environmental knowledge questions. The maximum possible score for both scales was 50.

The second part of the questionnaire looked into students' use of mass media. Students were asked about the average time they spent watching television or listening to radio each day, and how frequent they attended to television news, radio news, Chinese and English newspapers.

5. Findings

By the end of May, 1995, 30 schools had returned the completed questionnaires. Sample A consisted of 15 schools completing Questionnaires A. Sample B consisted of 15 schools completing Questionnaires B. Altogether 538 Questionnaire A and 494 Questionnaire B were received. The total data sample size was 1,032. Therefore, the actual response rate was 64.5 percent. The sample profile of the respondents is summarized in Table 1.

[TABLE 1 ABOUT HERE]

There were roughly equal numbers of males and females. About 87 percent were in forms 3 and 4 (i.e. grade 9 and 10) and the rest were in form 6 (i.e. grade 12). Over one third of the total sample lived in private housing; 36 percent lived in public housing; 16 percent lived in government subsidized housing and the other 11 percent lived in rented flats. Sample A and Sample B significantly differed in gender and education. Sample A contained a higher proportion of female students and students in lower forms.

5.1 Environmental knowledge

The percentages of students giving correct answers to the 80 questions on general and local environmental knowledge are listed in Table 2. They are arranged by environmental issues and in descending order of percentages of correct answers.

[TABLE 2 ABOUT HERE]

The results indicated that students were very knowledgeable on many environmental issues. Out of the 80 questions asked, 34 questions were correctly answered by at least 70 percent of the respondents. Only 11 questions were correctly answered by less than 30 percent of the respondents.

Students were more knowledgeable about wildlife issues. At least half of the respondents gave correct answers to all questions except the significance of Mai Po natural habitat to the migratory birds. It is probably because the wildlife issues can be more lively, dynamic, and colorful than other environmental issues.

On the other hand, students were least knowledgeable about world population. Only one in two students could recall the international meeting on world population held in September 1994 and the annual growth of world population. The problem may be too remote or too big for them. Students were also less knowledgeable about rain forest destruction probably because Hong Kong is not geographically close to a rain forest.

Areas least known to students were identification of construction waste as main source of waste (6% correct) and Deep Bay as the most polluted watercourse (13% correct). A majority (55%) of students mistook that industrial waste was the major source of waste in terms of volume. The misconception may come from the constant news reporting on heavily polluted rivers and harbours caused by industrial wastes. Some toxic industrial wastes are perceived to be dangerous and therefore invite more concern by the public. Another misconception was about the most polluted watercourse in Hong Kong. Majority of students incorrectly picked Victoria Harbour (43%) and Tolo Harbour (38%) to be the most polluted area. This is probably because pollution in Deep Bay was very seldom reported in the mass media. Deep Bay was also located in remote area where students seldom visit.

Scores for 20 questions on general and local environmental knowledge are summed to give the general and local environmental knowledge scores respectively. The scores for all questions are summed to give the total environmental knowledge score. Results indicated that respondents were rather knowledgeable in general as well as local environmental issues.

Students, on average, scored 32.2 on general environmental knowledge and 28.5 on local environmental knowledge (both with a maximum possible score of 50). The mean score for total environmental knowledge was 60.7. About two thirds of the respondents scored between 51 to 70 on the total environmental knowledge. The frequency distribution of total environmental knowledge was negatively skewed. That means there are relatively more students who possess more total environmental knowledge.

There was no significant difference in general, local and total environmental knowledge scores between Sample A and Sample B. This may indicate that both samples are similar in the possession of environmental knowledge. It may also suggest that Questionnaire A and Questionnaire B are quite similar in level of difficulty.

5.2 Use of mass media

Use of mass media reported by the respondents are shown in Table 3. Students heavily consumed broadcast media. Some 44% reported they on average watched television program for 4 or more hours per day, excluding viewing of pre-recorded tapes or laser discs. The average television viewing time was much higher than that of the general population who watched 3.5 hours per day (Survey Research Group, 1994). Listening to radio was not so popular among the respondents. Over half of them listened less than one hour per day. However, there was a group of heavy radio audience (12%) who listened 4 or more hours per day. Television news was very popular among students. Six out of ten students watched news programs at least 4 days a week. Radio news was not so popular among students. Only three out of ten listened to radio news at least 4 days a week.

Newspaper reading was less popular than television news viewing among the respondents. Four out of ten students read Chinese dailies four days a week and only one in ten students read an English daily four days a week.

[TABLE 3 ABOUT HERE]

5.3 Internal consistency of the environmental knowledge scale

Results indicated that there was strong positive and linear relationship between general and local environmental knowledge. The Pearson correlation coefficients between general and local environmental knowledge scores was 0.62. This indicated that both general and local environmental knowledge were measuring a very similar construct. The alpha coefficients of total environmental knowledge for Questionnaires A and B were 0.65 and 0.76 respectively. The coefficients exceeded the acceptable level of 0.4 (Kuhn and Jackson, 1989). This indicated that both questionnaires exhibited high level of internal consistency for environmental knowledge.

The 80 tested questions contained a wide range of ecological and environmental issues at different level of difficulty. The pool of questions forms a very useful set for subsequent studies on environmental knowledge. Questions on general environmental knowledge will be useful for conducting cross-cultural studies on environmental knowledge.

5.4 Environmental knowledge and use of mass media

To what degree does the use of mass media predict students' environmental knowledge? Are students who spend more time with mass media more knowledgeable about the environment? The Pearson correlation coefficients between environmental knowledge and students usage of mass media are summarized in Table 4. Nearly all the correlation coefficients were not significant at 0.05 level. Television news viewership was positively correlated with both general and local environmental knowledge. The correlation coefficients were 0.18 and 0.12 respectively. This means that the more frequently students watched television news, the more general and local environmental knowledge they possessed. The nil relationship between degree of television viewership and environmental knowledge suggests that students are more likely to obtain environmental knowledge from news than from other programs. Positive but weak correlation was found between Chinese dailies readership and general environmental knowledge in the combined sample. This suggests that students learn more about the environment from television news than newspapers.

[TABLE 4 ABOUT HERE]

To conclude, viewing of television news and readership of Chinese newspapers were correlates of environmental knowledge. The correlation was relatively stronger for television news viewing than for Chinese newspaper readership. The findings suggest that students learn more about the environment from television news than general television programs and newspapers. This may be because environmental news is less prominent in newspapers than in television news programs.

5.6 Predicting environmental knowledge

To examine the relative contribution of demographic variables and use of mass media to the prediction of environmental knowledge, multiple regression analysis using demographic variables only (Model 1) and together with use of mass media variables (Model 2) was performed. The results are summarized in Table 5.

[TABLE 5 ABOUT HERE]

When all demographic variables were included in Model 1, a statistically significant R square value of 0.09 was obtained. This indicated that 9% of the total variation of the dependent variable of total environmental knowledge could be explained by demographics of respondents. The relative importance of gender, education and type of housing were demonstrated by the standardized regression coefficients of -0.20 ($p<0.001$), 0.22 ($p<0.001$) and 0.03. Higher education and male respondents correlates with higher environmental knowledge.

With the addition of variables on use of mass media in Model 2, the R square value increased to 0.12. Use of mass media contribution additional 3% of the variation. Viewing of television news and English newspaper readership had significant beta values. Their standardized regression coefficients were 0.17 ($p<0.001$) and -0.07 ($p<0.05$) respectively. Heavy viewers of television news correlates with higher total environmental knowledge. It was rather difficult to explain the negative relationship between English newspaper readership

and total environmental knowledge. Perhaps heavy English newspaper readers were less interested about environment issues.

The results of regression analysis to predict the general and local environmental knowledge are very similar. Higher education, gender (male), and viewing of television news were positive correlates of general environmental knowledge. Higher education, gender (male), viewing of television news and reading of English newspapers were positive correlates of local environmental knowledge.

In all regression models, the multiple R square values were quite low. One of the reason is the great difference on level of scales used for environmental knowledge and for demographics and mass media usage variables. While the scale for knowledge is much refine with 40 items, the scales for predicting variables are all in less than five point scales. As the sample size is large and there is a wide dispersion of knowledge scores, it is unlikely that the predictors can explain a large proportion of the variance of environmental knowledge.

To conclude, results indicated that demographics and use of mass media were correlates of environmental knowledge. Gender (male), education and viewing of television news are major correlates of general, local and total environmental knowledge.

6. Conclusion

Hong Kong students were very knowledgeable on general and local environmental issues. Out of the 80 environmental knowledge questions tested, 34 questions were corrected answered by at least 70 percent of the respondents. The mean scores for general and local environmental knowledge were 32.2 and 28.5 respectively on a 50-point scale. The mean score for total environmental knowledge on a 100-point scale. Students were more knowledgeable about wildlife and air pollution issues. These two topics are more lively and more relevant to their daily life. Students were less knowledgeable about remote environmental issues like world population and rain forests. However, students' environmental knowledge is shaped and limited by the reporting of environmental news in

Hong Kong. They were least knowledgeable in identification of causes and effects of pollution. This is probably attributed to the low priority of environmental issues among the print and electronic media. Environmental news is seldom covered in details exploring the complicated network of causes and consequences. This study points to future improvement in coverage of environmental news.

The Cronbach alpha coefficients for the environmental knowledge for Questionnaires A and B were 0.65 and 0.76 respectively. This indicates that the internal consistency of the total environmental knowledge scale was satisfactory. The set of questions forms a useful tool for subsequent studies on environmental knowledge. Questions on general environmental knowledge can also be used for cross-cultural studies.

There was a positive and linear relationship between students' environmental knowledge and use of mass media. Television news viewership had positive and linear correlation with students' environmental knowledge. The finding was consistent with Chan's (1996) study that television was quoted by 87 percent of the students as major sources of environmental information. The nil relationship between degree of television viewership and environmental knowledge suggests that general types of television programs was not effective in disseminating environmental knowledge.

Gender (male), education and viewing of television news were major correlates of general, local and total environmental knowledge. Male students scored higher in both general and local environmental knowledge. It may be that environmental knowledge is built on some basic understanding of science and technology of which boys are usually more knowledgeable. In subsequent studies, science literacy, measured by the level of science education, should be included as one of the demographic variables for prediction of environmental knowledge. The result that higher form students scored higher in environmental knowledge provides some evidence for effectiveness of long-term environmental education at schools.

The study illustrates the relationship between use of mass media and students' environmental knowledge. The results seem to suggest that students learn more about the

environment from television news, than viewing of general television programs and newspaper readership. It is recommended that news coverage on environmental issues should be enhanced in the mass media in order to cultivate an environmentally informed public. Further studies can be conducted to explore the relationship between use of mass media, environmental knowledge, attitudes and pro-environmental behaviors for the public.

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Tables

Table 1 Sample profile of respondents (N=1,032)

Demographic	No.	(%)
Total	1,032	(100.0)
Gender		
Female	533	(53.8)
Male	474	(46.2)
Education		
Form 3	382	(37.2)
Form 4	511	(49.8)
Form 6	133	(13.0)
Housing type		
Owned private housing	378	(36.8)
Public housing	373	(36.3)
Government subsidized housing	161	(15.7)
Rented flats	115	(11.2)

Cells may not sum up to total due to missing cases.

Table 2 Environmental cognition

Type	Question asked (correct answer)	% correct
	Population	
G	What is the world population? (5.7 billion)	67.1
G	Which of the listed countries has the largest population? (India)	66.0
G	Which international environmental meeting was held in Egypt last September? (World population)	25.7
G	What is the annual growth of world population? (0.1 billion)	24.5
	Energy	
G	Which of the following sources of energy is polluting and non-recyclable? (fossil fuel)	95.1
L	The nuclear plant nearest to Hong Kong is located at: (Daya Bay)	93.9
G	Which war has caused serious pollution resulted from oil field fires in 1991? (Persian Gulf War)	85.0
G	Is nuclear power a pollutant-free source of energy? (No, nuclear waste is dangerous)	62.3
G	Which nuclear plant in Russia exploded in 1986? (Chernobyl)	56.1
L	What is the cause for the recent operation halt in Daya Bay nuclear plant? (control rods failed to meet test requirement)	49.2
G	Which way of nuclear waste disposal is less commonly employed? (dumps at sea)	30.9
G	Which nuclear plant in USA exploded in 1973? (Three Miles Island)	18.0
	Wildlife	
L	Which area in Hong Kong accommodates the largest number of migratory birds? (Mai Po)	90.9
G	Why are rhinos killed in large number? (for their horns are perceived to have medical uses)	88.5
L	Which endangered species was targeted in a campaign for protection during the development of the new Hong Kong airport? (tree frog)	87.0
G	What role do national parks play in conservation? (provide natural habitat to endangered species)	79.6
G	Which is the main reason for the decline in wildlife? (destruction of habitat)	78.7
G	Why the number of pandas decline rapidly? (Because bamboo, pandas' major diet, decreases vastly in volume)	75.1
G	Which of the following is an endangered species? (whale)	58.5

...Table 2 Environmental cognition

Type	Question asked (correct answer)	% correct
	Wildlife	
G	How do plastic bags affect marine life such as tortoise? (die because of suffocation)	57.1
G	How does oil pollution affect sea birds? (birds cannot fly and subsequently die from suffocation and hunger)	53.2
L	What is the significance of Mai Po natural habitat? (where migratory birds find food)	24.7
	Global warming and ozone depletion	
G	The effect of ozone layer depletion on human beings is: (increasing the chance of having skin cancer)	92.9
G	What is the function of ozone layer? (screening of UV radiation)	90.9
G	Global warming causes: (marine level to rise)	74.0
G	What contributes to the rapid increase of carbon dioxide in the atmosphere? (burning of fossil fuels)	72.3
G	Which of the listed item contains material that depletes the ozone layer? (CFC in refrigerator coolants)	44.8
G	Over where is there a hole in the ozone layer? (the Antarctic)	25.9
	Rain forest	
G	Rain forests are particularly important to mankind, because: (they contain huge variety of plants with medical uses)	57.1
G	Which areas in the world suffered the greatest lost of rain forest? (Central and South America)	46.8
	Acid rain	
G	What harm does acid rain do to the environment? (wear down exterior of buildings)	83.4
G	Which gas reacts with damp air to form acid rain? (sulphur dioxide)	57.8
	Air pollution	
L	Why does the government encourage the use of unleaded petrol? (exhaust gas from unleaded petrol is less polluting)	93.3
L	Suggest one way to reduce the leaded exhaust gas from vehicles. (switch to unleaded petrol)	92.4
G	What illness can be caused by air pollution? (respiratory illness)	89.8
L	Why does the government want to phase out incinerators? (gaseous emission from incinerators is highly polluting)	84.4

...Table 2 Environmental cognition

Type	Question asked (correct answer)	% correct
	Air pollution	
G	Why planting trees can make air fresher? (trees release oxygen)	84.0
G	What is the effect of prolong intake of exhaust gas from leaded petrol on children? (neuro-psychological effects)	57.3
L	Which gas in most of the car parks in Hong Kong exceeds the guidelines by World Health Organization? (carbon monoxide)	46.8
L	What is the major contributor to the high level of nitrogen dioxide in Hong Kong? (exhaust gas from motor vehicle)	45.5
	Waste management	
G	Which of the following materials is non-biodegradable? (polystyrene)	91.6
L	Which of the following waste materials can be recycled locally? (aluminum cans)	83.1
L	Why is paper production polluting? (dying process during paper production is polluting)	73.1
L	Which method of waste treatment is less polluting? (disposal at landfills)	71.2
L	The major method of waste treatment employed in Hong Kong is: (disposal at landfills)	55.6
L	Which of the following waste materials can be recycled locally? (glass)	53.4
L	What is the undesirable side-effect of landfill treatment? (production of leachate gas)	52.4
L	Where is the only chemical waste treatment facilities in Hong Kong? (Tsing Yi)	50.7
L	How many plastic bags do Hong Kong people on average use daily? (15 million)	42.7
L	Why does Hong Kong government force the removal of asbestos? (asbestos is hazardous air contaminant)	37.2
L	Which government department enforces the livestock waste treatment regulations? (Environmental Protection Department)	18.6
L	Which is the major source of waste in Hong Kong in terms of volume? (construction waste)	5.7
	Noise pollution	
G	What is the unit for measuring noise? (dB)	91.3
G	What damages can noise exceeding 180 dB do to the hearing ability? (ear drum damage)	54.6

..Table 2 Environmental cognition

Type	Question asked (correct answer)	% correct
	Noise pollution	
L	What is the major source of noise pollution in Hong Kong? (construction sites)	38.3
L	How does Hong Kong government control construction noise? (via a permit system)	34.9
	Marine pollution	
G	What illness can be caused after eating contaminated shellfish? (hepatitis)	89.1
L	What diseases will swimmers easily catch if beaches are polluted? (skin disease)	84.0
L	Why plenty of marine life dies when there is a red tide? (Red tide lowers oxygen content of watercourse)	73.5
L	Which government department is responsible for the clearing of oil in Hong Kong marine territory? (Marine Department)	69.1
L	The indicator to measure the pollution level of beaches in Hong Kong is : (level of E. coli)	42.9
L	What is the most serious pollution problem in Tolo Harbour? (high content of toxic metal)	39.0
L	What is a red tide? (microscopic algae)	35.4
L	What factor contributes most to the pollution in Deep Bay? (chemical waste)	24.0
L	The most polluted watercourse in Hong Kong is: (Deep Bay)	13.0
	Environmental awareness and protection	
G	Which of the following is one of the conserving lifestyles? (use less paper towels)	91.3
L	Which of the following is one of the conserving lifestyles? (use biodegradable cleansing agent)	90.5
L	What theme does the Mr. World in the TV campaign advocate? (to protect the environment, save the earth)	89.7
G	Which type of battery is less polluting? (rechargeable)	81.4
L	Which of the following is an environmental organization? (Friends of the Earth)	77.9
L	Which of the following is a territory wide environmental awareness campaign? (World Environment Day)	77.7

...Table 2 Environmental cognition

Type	Question asked (correct answer)	% correct
	Environmental awareness and protection	
L	Which government department is responsible for establishing environmental protection policies? (Environmental Protection Department)	77.1
G	What was the cause for death of thousands of people in Minamata in Japan? (mercury poisoning)	56.7
G	Which of the following is an international environmental organization? (Worldwide Fund for Nature)	53.2
L	Which of the following is a territory-wide environmental awareness campaign? (Environmental Protection Festival)	50.4
L	Which of the following environmental protection campaign is organized by government? (reduce waste)	43.3
L	Which of the following is an environmental organization? (Conservancy Association)	40.0
G	Which is more conserving, consuming vegetable or meat? (vegetable, because grazing procures huge volume of crops)	37.0
G	The date of World Environment Day is: (June 5)	29.9
L	Which organization initiated the slogan " Environmental Protection Starts With Me" ? (Environmental Campaign Committee)	28.7

Notes:
G = general environmental knowledge L = local environmental knowledge
Number of answers to individual questions may be different due to missing cases.

Table 3 Use of mass media

Use of mass media	No.	(%)
TV viewing per day		
less than one hour	61	(5.9)
1- less than 2 hours	147	(14.3)
2- less than 3 hours	172	(16.7)
3- less than 4 hours	200	(19.5)
4 or more hours	447	(43.5)
Radio listening per day		
less than one hour	539	(52.6)
1- less than 2 hours	200	(19.5)
2- less than 3 hours	100	(9.8)
3- less than 4 hours	65	(6.3)
4 or more hours	121	(11.8)
Television news viewing in the past week		
0-1 day	137	(13.4)
2-3 days	258	(25.1)
4-5 days	271	(26.4)
6-7 days	360	(35.1)
Radio news listening in the past week		
0-1 day	548	(53.6)
2-3 days	221	(21.6)
4-5 days	118	(11.5)
6-7 days	136	(13.3)
Chinese newspaper readership in the past week		
0-1 day	322	(31.4)
2-3 days	270	(26.3)
4-5 days	179	(17.4)
6-7 days	256	(24.9)
English newspaper readership in the past week		
0-1 day	750	(73.0)
2-3 days	164	(16.0)
4-7 days	113	(11.0)

Table 4 Correlation between use of mass media and environmental knowledge

	Pearson correlation coefficient with		
	general environmental knowledge	**local environmental knowledge**	**total environmental knowledge**
TV viewing	0.00	0.00	0.00
Radio listening	-0.04	-0.01	-0.03
TV news viewing	0.18**	0.12**	0.18**
Radio news listening	0.01	0.00	0.01
Chinese newspaper readership	0.07*	0.00	0.04
English newspaper readership	0.03	-0.04	0.00

Notes:
* = significant at 0.05 level
** = significant at 0.01 level

Table 5 Prediction of total environmental knowledge

Variable	Model 1 beta	s.e. of beta	Std. beta	Model 2 beta	s.e. of beta	Std. beta
Demographic						
Gender	-4.9**	0.7	-0.20	-4.3**	0.7	-0.18
Education	4.0**	0.5	0.22	4.3**	0.6	0.24
Housing	0.8	0.7	0.03	1.0	0.7	0.04
Use of mass media						
TV viewing				0.0	0.3	0.00
Radio listening				-0.2	0.3	-0.03
TV news viewing				1.9**	0.4	0.17
Radio news listening				0.1	0.4	0.01
Chinese newspaper readership				-0.1	0.3	-0.01
English newspaper readership				-1.2*	0.6	-0.07
Multiple R square			0.09			0.12

Note: Gender: 1= male, 2= female; Education: 1= form 3, 2= form 4, 3= form 7;
Housing type: 1= public/rented housing, 2=government subsidized/private housing
** significant at 0.001, * significant at 0.05